

**REMARKS**

**Status of the claims:**

With the above amendments, claims 1, 2, and 8 have been amended, and claim 3 has been canceled. Claims 5 and 9-14 have been withdrawn from a prior election of species requirement, which Applicants traverse below. Accordingly, Applicants submit that claims 1, 2, and 4-14 are pending and ready for further action on the merits. No new matter has been added by way of the above amendments. Reconsideration is respectfully requested in light of the following remarks.

**Information Disclosure Citation**

The Examiner has not provided Applicants with an initialed copy of the PTO-1449 form filed with the Information Disclosure Statement filed February 20, 2001. An initialed copy thereof is respectfully requested from the Examiner with the next communication.

**Restriction/Election of Species**

The Examiner asserts that the elected species (III) as appears in claims 6 and 7 read on claims 1-3 and 6-8. The Examiner acknowledges that claims 6 and 7 are allowable. Thus, the Examiner has broadened the search to species (I) as appears in claim 4. The Examiner asserts that prior art has been found

on species (I) and thus has ended the search at this point. Accordingly, the Examiner asserts that only claims 1-4 and 6-8 are examined. However, in light of the below comments regarding the prior art rejections, Applicants traverse the rejection in that Applicants believe that the Examiner has failed to present any *prima facie* art rejections. Please see the below response.

**Rejections under 35 USC §112, second paragraph**

Claims 1-3 and 8 have been rejected under 35 USC §112, second paragraph as being indefinite. The Examiner asserts that the word "and" should be changed to the word "or" at pages 243, line 17, page 244, line 22 and page 252, line 24. Because exact Markush language has not been employed, Applicants agree with the Examiner and have amended the claims accordingly in the response. Applicants believe that with these amendments that the rejections have been obviated. Withdrawal of the rejection is warranted and respectfully requested.

**Rejections under 35 USC §102/103**

Claims 1-3 are rejected under 35 USC §102(b) as being anticipated by or in the alternative, under 35 USC §103(a) as being unpatentable over Mecking et al. (J. Am. Chem. Soc., 120, pp.888-899, (1998)).

Claims 1-3 are rejected under 35 USC §102(e) as being anticipated by or in the alternative, under 35 USC §103(a) as being unpatentable over Bensleben '664 (US Patent No. 6,410,664) and Bensleben '715 (US Patent No. 6,197,715).

Claim 4 is rejected under 35 USC §103(a) as being unpatentable over Bensleben '664 and Bensleben '715.

These rejections are traversed for the following reasons.

### **Present Invention**

The present invention, as recited in claim 1, relates to a process for preparing a polar olefin copolymer comprising:

copolymerizing a non-polar olefin and a polar olefin in the presence of a catalyst comprising

(A0) a compound of a transition metal selected from Groups 4, 5, 6, or 11 of the periodic table, which is represented by the following formula (1):



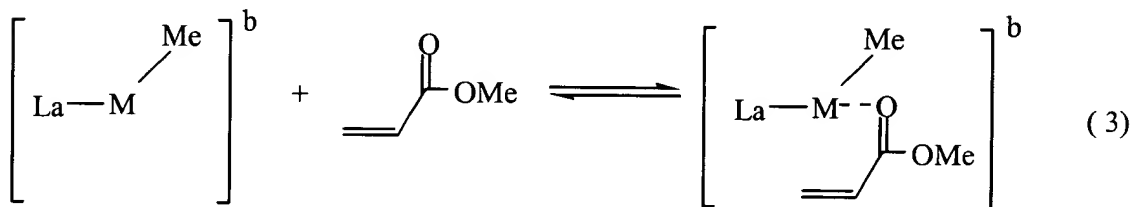
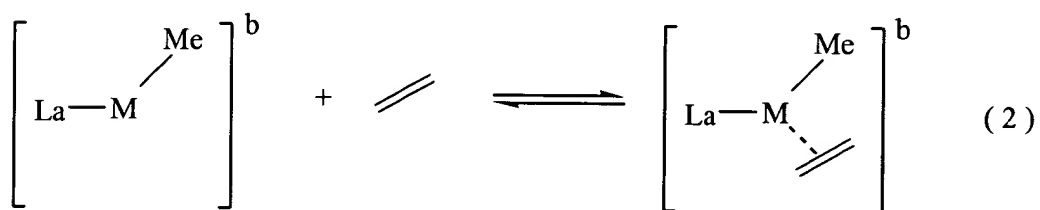
wherein M is a transition metal atom selected from Groups 4, 5, 6, or 11 of the periodic table,

m is an integer of 1 to 6,

n is a number satisfying a valence of M,

L is a ligand coordinated to M and each ligand L has a feature that when the value obtained by subtracting the total sum of the whole energy, as determined by a density functional

method, of the compounds on the left-hand member from the whole energy, as determined by a density functional method, of the compound on the right-hand member in the following chemical formula (2) and the value obtained by the same subtraction in the following chemical formula (3) are defined as coordination energy  $E_1$  of ethylene and coordination energy  $E_2$  of methyl acrylate, respectively, the difference  $\Delta E$  ( $\Delta E = E_1 - E_2$ ) between the coordination energy  $E_1$  of ethylene and the coordination energy  $E_2$  of methyl acrylate is 50 kJ/mol or less,



wherein M is the same transition metal atom selected from Groups 4, 5, 6, or 11 of the periodic table as M in the formula (1), a is an integer of 1 to 3, b is an electric charge of the compound in the brackets [ ] and is 0 or 1, and Me is a methyl group,  
and

X is a hydrogen atom, a halogen atom, an oxygen atom, a hydrocarbon group, an oxygen-containing group, a sulfur-containing group, a nitrogen-containing group, a boron-containing group, an aluminum-containing group, a phosphorus-containing group, a halogen-containing group, a heterocyclic compound residual group, silicon-containing group, a germanium-containing group or a tin-containing group, and when n is 2 or greater, plural atoms or groups indicated by X may be the same or different, and plural groups indicated by X may be bonded to each other to form a ring.

**Removal of the Rejection over Mecking et al.**

The instant invention has been amended so that the transition metal in the catalyst in compound (A0) is selected from Groups 4, 5, 6 or 11. This excludes Group 10 metals such as palladium, nickel, etc. Mecking et al. teach only a palladium catalyst (i.e., a group 10 metal). Thus, the catalyst of the present invention is clearly distinguishable from the catalyst disclosed in Mecking et al.

Moreover, Applicants respectfully point out that the  $\Delta G$  in Mecking et al. referred to by the Examiner is not the same as the  $\Delta E$  of the instant invention. The  $\Delta G$  in Mecking et al. refers to a measurement value that is derived from an Eyring plot, whereas the  $\Delta E$  referred to in the instant invention is a

calculated value under a prescribed set of conditions as is described at page 32, line 22 to page 33, line 14 of the instant written description. Accordingly, the two values are not the same and there is no reasonable basis on which these two values can be compared.

Moreover, in addition to the above differences, Applicants respectfully point out that the methacrylate ligand in formula (3) of present claim 1 assumes the coordination of the carbonyl oxygen, whereas the methacrylate group in Mecking et al. assumes the coordination of a  $\pi$  bond. Thus, the teaching of Mecking et al. does not fit within the scope of the instant invention. In other words, the rejection is inapposite. Withdrawal of the rejection is warranted and respectfully requested.

**Removal of the Rejections over Bensleben '664 and Bensleben '715**

Regarding claims 1-3 and Bensleben '664 and Bensleben '715, the Examiner appears to assert that the catalyst that appears at column 3 lines 15 to 25 in Bensleben '664 and Bensleben '715 and the catalyst in claim 1 overlap. Applicants believe neither Bensleben '664 nor Bensleben '715 disclose or suggest the copolymerization of a non-polar olefin with a polar olefin. The Examiner further asserts that column 30, lines 24 to 53 in Bensleben '664 discloses copolymerization between functionalized

cyclic olefins and ethylene. Applicants do not agree and submit that the Examiner's assertion is erroneous. Column 30, line 24 says "Copolymerization with Functional Cyclic Olefins" (i.e., not "functionalized"). "Functional" means that the copolymerization can be done, not that the olefin has a polar group on it (i.e., "functionalized"). Applicants note that at column 11, lines 30-35, Bensleben '664 defines what is meant by cyclic olefins. Applicants note that none of these olefins at column 11, lines 30-35 in Bensleben '664 are polar. Accordingly, Applicants submit that Bensleben '664 and Bensleben '715 cannot anticipate or render obvious claims 1-3 because both Bensleben '664 and Bensleben '715 fail to disclose the elements of the instantly claimed invention.

Moreover, as defined in the amended claims, the present catalyst contains a transition metal in compound (A0) that is selected from Groups 4, 5, 6 or 11.

Bensleben '664 discloses at column 4, lines 46-52 (also see Bensleben '715 at column 9, lines 2-8) that in the catalyst of formula (I), M represents one of the transition metals that is a Group IV of a Group VIII transition metal selected from Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt in the +2 oxidation state or Ti, Zr, or Hf in the +4 oxidation state. Bensleben '664 and Bensleben '715 further disclose that N is preferably a late transition metal selected from iron, cobalt, nickel, or palladium of Group

VIII and most preferably nickel or palladium. In the examples, Bensleben '664 and Bensleben '715 only disclose Ni. The transition group VIII metals are outside the scope of the instant claims.

In other words, Bensleben '664 and Bensleben '715 do not disclose the unexpected effects obtained in the instant invention when using it for the copolymerization for a non-polar olefin with a polar olefin as disclosed in the present application.

In contrast to Bensleben '664 and Bensleben '715, the present invention claims a process for preparing a polar olefin copolymer in the presence of a specified catalyst that gives a polar olefin copolymer with excellent properties under mild conditions.

Bensleben '664 and Bensleben '715 fail to disclose or suggest copolymerization of a non-polar olefin with a polar olefin in the presence of a specific catalyst as is claimed in the present invention. Accordingly, Applicants submit that the instant invention can neither be anticipated nor rendered obvious by Bensleben '664. Withdrawal of the rejections regarding claims 1-3 is warranted and respectfully requested.

Regarding claim 4, Applicants also submit that neither of Bensleben '664 or Bensleben '715 render obvious the instant invention for the following reasons. The Examiner asserts that

the transition metal of the examples in Bensleben '664 and Bensleben '715 is Ni rather than a metal from Groups 4, 5, 6, and 11, however, the transition metals of Group 4 such as Zr, Ti, and Hf are taught.

As was discussed above, Bensleben '664 and Bensleben '715 merely teach transition metals of Group IV, and do not recognize any of the unexpected benefits that are obtained when using the claimed catalyst on the copolymerization of a non-polar olefin with a polar olefin as is disclosed (and claimed) in the instant invention.

In contrast to Bensleben '664 and Bensleben '715, the instant invention, claims a process for preparing a polar olefin copolymer in the presence of a specified catalyst that gives a polar olefin copolymer with excellent properties under rather mild conditions.

Bensleben '664 and Bensleben '715 fail to disclose or suggest the copolymerization of a non-polar olefin with a polar olefin in the presence of the specifically claimed catalyst of the instant invention. Thus, Applicants assert that the Examiner has failed to make out a *prima facie* case of obviousness with regard to the 35 USC §103(a) rejection over Bensleben '664 or Bensleben '715. Three criteria must be met to make out a *prima facie* case of obviousness.

- 1) There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.
- 2) There must be a reasonable expectation of success.
- 3) The prior art reference (or references when combined) must teach or suggest all the claim limitations.

See MPEP §2142 and *In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991). The Examiner has failed to meet any of these requirements to make a *prima facie* case. However, in particular, the Examiner has failed to meet the third element to make a *prima facie* obviousness rejection. Neither Bensleben '664 nor Bensleben '715 disclose or suggest the copolymerization of a non-polar olefin with a polar olefin in the presence of the specifically claimed catalyst of the instant invention. Accordingly, Applicants submit the rejection is inapposite. Withdrawal of the rejection is warranted and respectfully requested.

With the above remarks and amendments, it is believed that the claims, as they now stand, define patentable subject matter such that passage of the instant invention to allowance is warranted. A Notice to that effect is earnestly solicited.

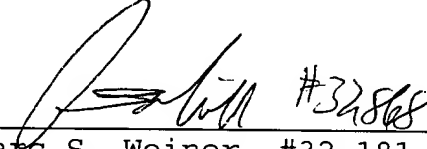
If any questions remain regarding the above matters, please contact Applicant's representative, T. Benjamin Schroeder (Reg.

No. 50,990), in the Washington metropolitan area at the phone number listed below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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